

Cosmonauts expect to restore power with space walk

By John Lawrence

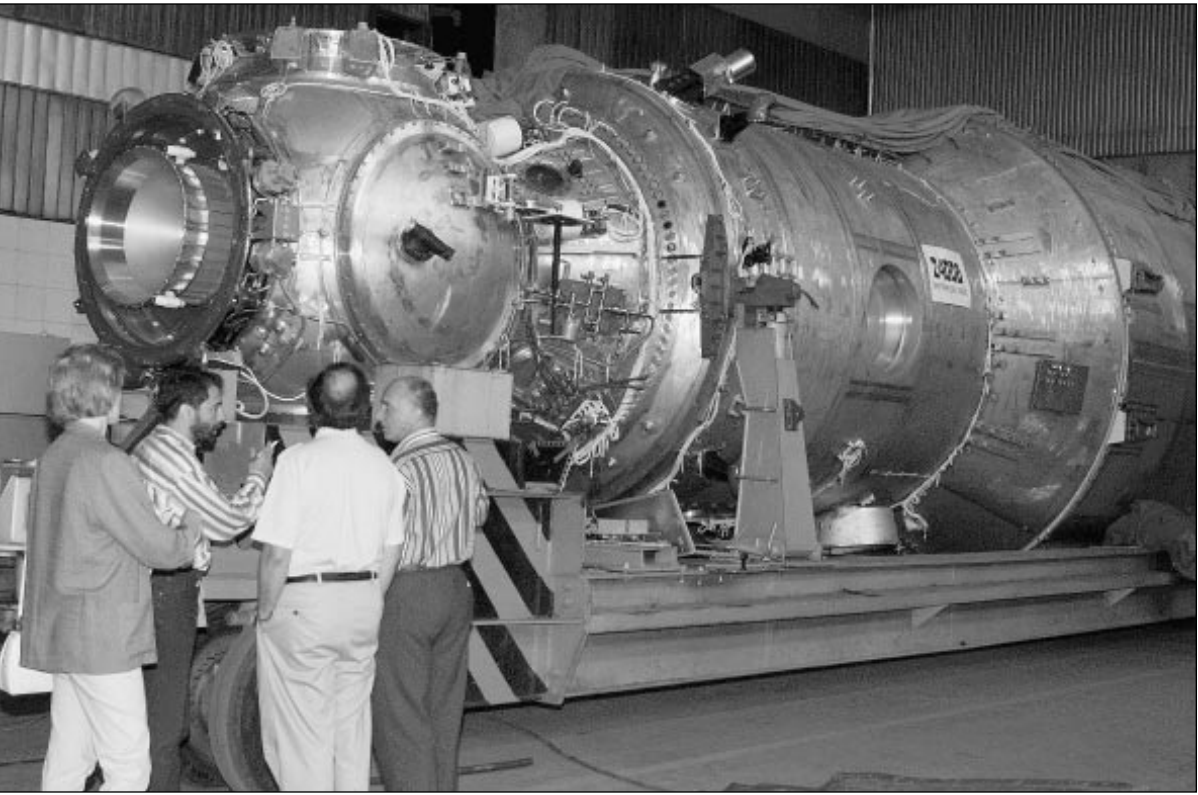
Contingency planning to restore power to the Russian Mir Space Station continues to evolve and mature in the wake of the June 25 collision with a Progress resupply vehicle. American Astronaut Mike Foale said the planning and repair work provide an opportunity for the two countries to get ready to maintain the future International Space Station. "We're going to have events like this, I think, in the future in our combined space programs," Foale told NASA Administrator Dan Goldin from on board Mir. "And the way we're learning to work together, the way we're understanding how people respond to these emergencies, is very, very useful." Plans now focus on the two cosmonauts entering the unpressurized Spektr module to install a specially manufactured plate. Cable

connections will be reestablished through junctions built into the plate, which will be mounted between the node to which the Core module and Spektr are attached. The cables will route the flow of power from the three undamaged Spektr solar arrays to maintain proper charging of Mir's batteries, and will restore the capability to gimbal the arrays for maximum exposure to sunlight. NASA's space walk experts have worked closely with their Russian counterparts to fine tune plans, for the space walk. Mir 23 Commander Vasily Tsibliev and Flight Engineer Alexander Lazutkin will conduct the space walk while Foale will remain in the lower compartment of the Soyuz capsule.

Goldin spoke to Foale during a brief communications opportunity Tuesday, July 8. Foale displayed the modified hatch on down-link television, saying, "This is what was brought up on the Progress that's going to be used to allow the pass-through of the umbilicals from Spektr. This is going to attach onto the end cone of the Spektr. On the inside of the node the connectors you see there will be accessible to us. On the backside there already will have been stuck some cables—like a kind of Medusa of cables—and then during the EVA Vasily and Sasha will connect these cables to the power cables that are now floating free in Spektr, which will provide the means to obtain the power from Spektr to the base block."



Procedures for the repair were being worked out by two veteran Russian cosmonauts with space walking experience, Sergei Krikalev and Nikolai Budarin, working with Russian and U.S. specialists in the Hydrolab facility at the Gagarin Cosmonaut Training Center. Krikalev and Budarin practiced procedures in a mockup of Spektr. In a communications session with the Mir, they told the Mir 23 crew that the internal space walk would be difficult, but can be performed successfully. The Mir crew was to have practiced the internal space walk on orbit this week. The suited cosmonauts were to rehearse using the transfer node and the Kvant-2 module, because its hatch is similar in design and size to the Spektr module hatch. Following this exercise, a joint U.S./Russian readiness review was to occur before the final "go."



Work on the Service Module, the first fully Russian contribution to the International Space Station planned for a December 1998 launch from Russia, reached a milestone this month as the module's electrical analog was moved to prepare for tests that will simulate the vibrations of launch. Looking at the electrical analog in Moscow as it was prepared for shipment on June 23 from left are NASA's Elena Maroka and Lee Lantsman of Boeing, both with NASA's Moscow Technical Liaison Office; Sergei Shaevich of Russia's Khrunichev State Research and Production Space Center in Moscow; and Vladimir Yain of the Russian Space Corporation-Energia. A flight-like simulator of the Service Module, the electrical analog was built at Khrunichev in Moscow and was moved to TsNIMASH, a subcontractor in the village of Sergey Posad, near Moscow, for testing. The Service Module electrical analog is used to precede some flight article tests and undergo other tests in lieu of the flight article. Once the tests simulating the vibration and shock environments of launch are completed in Sergey Posad, the analog will be shipped to Energia in Moscow to begin a series of integrated systems tests as a precedent to arrival of the flight article. Assembly of the Service Module flight article continues at Khrunichev, and it is expected to be shipped to Energia for testing in October 1997. The Service Module will provide the early navigation, control, power, life support systems and crew quarters for the International Space Station prior to the arrival of later U.S. modules.

Astronauts may now vote from space as governor signs bill for electronic transfer

By Toni Loftin

Astronauts who spend long periods of time in orbit may now cast their votes via electronic transfer. NASA Administrator Dan Goldin, JSC Director George Abbey and Astronaut John Blaha attended a signing ceremony July 9 at the State Capitol for House Bill 841. Gov. George Bush signed the bill that will enable orbiting astronauts to cast their ballots on election day. The bill, sponsored by State Sen. J.E. "Buster" Brown of Lake Jackson, came about as a result of Blaha missing the election in November during his stay on Mir.

Texas state law at the time did not allow voting by electronic mail. Authored by Rep. Mike Jackson of LaPorte and Rep. Patricia Gray of Galveston, the bill contains provisions for using NASA's electronic transmission program to send ballots to astronauts. Going into effect on Sept. 1, the law also is intended to benefit future astronauts working aboard the International Space Station. "Under our current election laws which allow lengthy periods for early voting, it was difficult to imagine any scenario where a registered voter in Texas would be

unable to find time to cast their ballot either by mail or in person," Jackson said in a statement issued after the signing. "That all changed with the cooperative space exploration program between the United States and Russia where our astronauts are spending months at a time on the Space Station Mir." Also in attendance for the signing were JSC Associate Director for Management Sue Garman, Phase 1 Program Manager Frank Culbertson, Phase 1 Program Deputy Manager Jim Van Laak, and Houston City Council Member Rob Todd.

Station service module begins launch testing

By James Hartsfield

Work on the International Space Station's Service Module, scheduled to be the third major station element to launch, reached a milestone recently as an electrical analog for the module in Moscow began vibration and shock testing that simulates the rigors of launch. The analog module, a flight-like simulation of the Service Module, is used to precede some flight article tests and undergo other tests in lieu of the flight article. Once the vibration and shock testing is completed, the analog module will be shipped to Energia facilities in Moscow. The Service Module will be the first fully Russian contribution to the International Space Station and will serve as the early cornerstone for the first human habitation of the station. It is scheduled to be launched unpiloted in December 1998 as the third station element to reach orbit, docking by remote control with the already orbiting Functional Cargo Block and Node 1. The 42,000-pound module, similar in layout to the core module of Russia's Mir Space Station, will provide the early station living quarters; life support system; electrical power distribution; data processing system; flight control system; and propulsion system. It also will provide a communications system that includes remote command capabilities from ground flight controllers. Although many of these systems will be supplemented or replaced by later U.S. station components, the Service Module will always remain the structural and functional center of the Russian segment of the International Space Station. The module will have a wingspan of 97.5 feet from tip to tip of the solar arrays, and it will be 43 feet long from end to end. The Service Module contains three pressurized compartments: a small, spherical transfer compartment at the forward end; the long, cylindrical main work compartment; and the small, cylindrical transfer chamber at the aft

end. An unpressurized assembly compartment is wrapped around the exterior of the transfer chamber at the aft of the module. The assembly compartment holds external equipment such as propellant tanks, thrusters and communications antennas. The Service Module will include four docking ports, one in the aft transfer chamber and three in the spherical forward transfer compartment—one facing forward, one facing up and one facing down. The aft docking port has a probe and cone docking mechanism to allow dockings by Progress resupply spacecraft and Soyuz piloted spacecraft. Living accommodations on the Service Module include personal sleeping quarters; a toilet and hygiene facilities; a galley; and a table for meals. The module will have a total of 14 windows. Exercise equipment will include a NASA-provided treadmill and a stationary bicycle. The crew's wastewater and condensation water will be recycled for use in oxygen-generating devices on the module, but it is not planned to be recycled for use as drinking water. The module also will provide data, voice and television communications with Mission Control Centers in Moscow and Houston. The Service Module will be launched on a Russian Proton booster. At launch, many systems will be in a standby mode. Once in orbit, preprogrammed commands onboard will fully activate its systems, the solar arrays will be deployed and the communications antenna will be deployed. The Service Module then will become the passive vehicle for the rendezvous with the already-orbiting Functional Cargo Block and Node 1 spacecraft. As the passive "target" vehicle, the Service Module will maintain a station-keeping orbit as the Functional Cargo Block/Node 1 vehicle performs the rendezvous and docking via ground control and the Russian automated rendezvous and docking system.

Internet News: Web sites help Inspection 97 team inform public, plan event

JSC is using the Internet to invite industry leaders to the center for this fall's Inspection 97 activities, and the internal web site is providing a mechanism for organizers and volunteers to coordinate the preparation of exhibits. Inspection 97, scheduled for Nov. 12-14, will give industry, business, community and education leaders a chance to inspect, at the working level, the technologies and facilities that JSC uses to meet its science, engineering, operations and management challenges. Inspection 97 will feature more than 100 exhibits and mini tours of several facilities at JSC. Exhibit categories will include: Engineering and Technology, Space Sciences, Medical Sciences, Operations and Space Program Overviews.

The external web site, built by Stephanie Castro, of the Space and Life Sciences Directorate's Program Integration Office, under the guidance of Inspection 97 coordinator Doug Blanchard, chief of that directorate's Earth Science and Solar System Exploration Division, provides information about the Inspection 97 activities and schedule and opportunities for potential participants to request additional information, join the Inspection 97 mailing list or sign up to attend. It also provides detailed information about exhibits and demonstrations featured in last



year's Inspection Day activities, which likely will be among this year's features as well. In addition, the page provides links to JSC's space shuttle, shuttle-Mir and International Space Station web sites, and to JSC's Office of Technology Transfer and Commercialization home page. The internal web site, also designed by Castro, shares information important to planning, organizing and executing Inspection 97 activities. There are links to a list of directorate representatives on the Inspection 97 team, to presentations and plans that have been formulated to date, to

an Inspection 97 organization chart, to minutes of planning meetings, to a list of the exhibits planned so far, and to a "compass chart" that represents what the public will see in the Inspection Day event program book and posters at each exhibit. In addition, it allows anyone to add a potential contact to the Inspection 97 mailing list so that JSC can attract the thousands of participants expected in November and keep them up to date on preparations. The internal site also provides a "mail to" link that will automatically allow employees using the site to send an electronic mail message to the address "inspection1@jsc.nasa.gov" for response by the Inspection 97 team.